

Project: Application of compost to alfalfa to improve soil structure and fertility

Project team: Michelle Leinfelder-Miles and Rachael Long (UCCE), Radomir Schmidt (UC Davis)

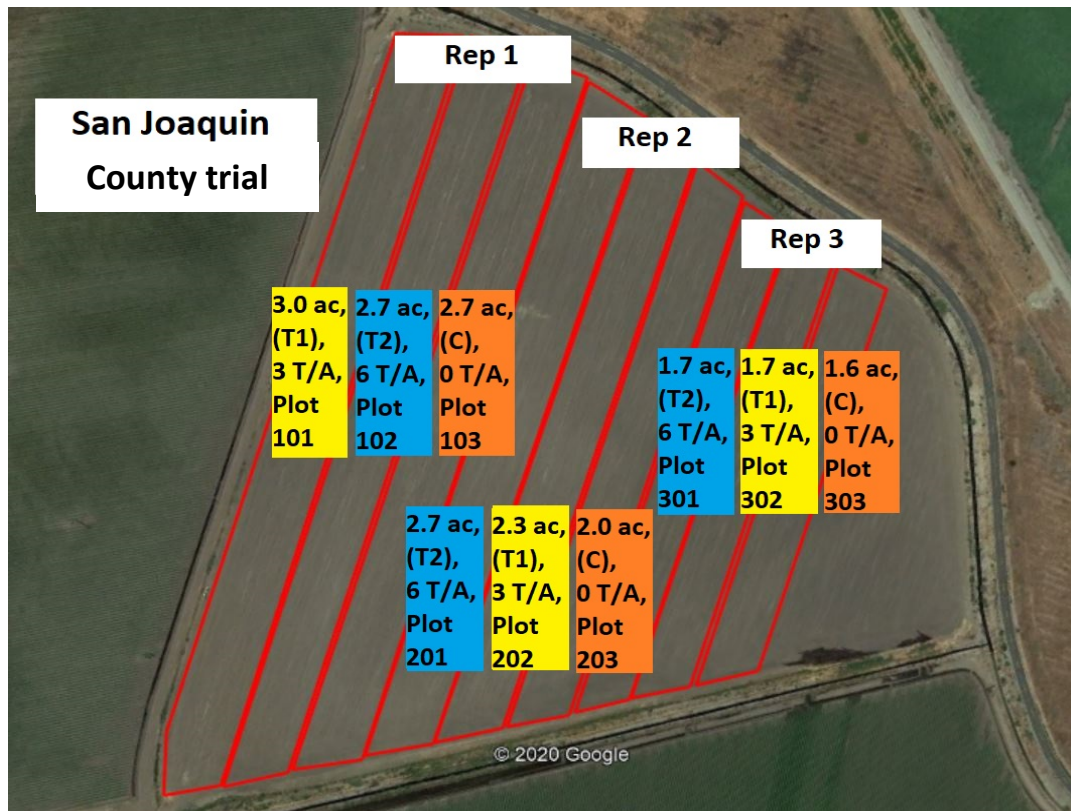
Trial locations: San Joaquin and Yolo counties

Questions of interest:

- A) Does surface application of green waste compost to alfalfa fields help to improve soil carbon and nitrogen storage, or soil physical characteristics, like water infiltration?
- B) How does annual compost application over three years impact alfalfa yield and greenhouse gas emissions?

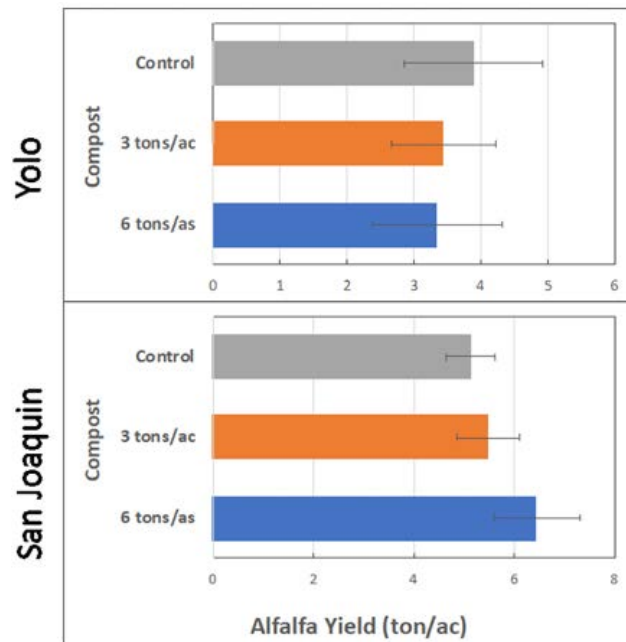
Description of San Joaquin County trial:

The soil at this site is a Peltier mucky clay loam that is considered partially to poorly drained. The trial is approximately 20 acres, and there is no history of compost application at this site. There are two green waste compost rates being compared to the untreated (non-composted) control. Compost applications are annually surface-applied in the fall/winter over a three-year period (2020-2022). Baseline soil samples were collected at the beginning of the study (October 2020), and annual sampling is done every fall season. Alfalfa yield is assessed 3-4 times per year by taking quadrat samples from the grower's windrows. Greenhouse gas samples are collected on a monthly basis.



Compost considerations: Compost is decomposed organic matter from plants or animals. Plant-derived composts have a high carbon-to-nitrogen ratio (C:N), which is the relative amount of carbon and nitrogen in the material. Animal-derived composts have a low C:N. The ratio is important because it affects microbial metabolic functioning and plant-available nitrogen. The green waste compost that was applied to this trial has a high C:N.

Preliminary yield results: In the first year after application (2021), there were no significant differences in yields among treatments, but there was a trend towards higher yields with compost at the San Joaquin County location. At the end of the trial, we will measure soil compaction and water infiltration to understand whether compost application improved these soil physical characteristics.



Other considerations: One of the challenges with compost is that it can take years for benefits to show in terms of increased yields and forage quality. In addition, costs for material plus hauling runs \$27/ton and spreading \$10/ton, totaling \$37/ton (2021 prices). To help offset compost costs, CDFA's Healthy Soils Program provides funding to farmers to implement soil conservation practices, like compost applications. The application process is expected to open in the fall of 2022, <https://www.cdfa.ca.gov/oefi/healthysouils/>. The website includes technical assistance resources for more information.